

CBased Environmental Pty Limited ABN 62 611 924 264



Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

AMENDMENT 3

September 2019

Colin Davies BSc MEIA CENVP

Environmental Scientist Date: 18 October 2019

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Executive Summary

CBased Environmental is contracted by Hanson Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes:

- Dust Deposition Gauges;
- Surface Waters:
- · Groundwaters; and
- Meteorological Station.

This report was prepared by CBased Environmental and includes the following;

- Dust Deposition results for September 2019;
- Surface Water quality results for September 2019;
- Bi-monthly Groundwater quality results for September 2019; and
- Meteorological report for September 2019.

The September 2019 dust deposition results for insoluble solids were variable when compared to August 2019. There were no excessively contaminated dust gauges this month. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m².month. Results were found to be representative of dust levels as determined by the Australian Standard.

Monthly surface water samples were collected at sites A, B, C1, C2 and F. D was not flowing at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any sites in September 2019.

Bi-monthly groundwaters were sampled on 1 October 2019. Groundwater depth generally decreased when compared to July 2019, with water moving towards the surface. pH at all sites is in the acidic range and generally remained similar or slightly decreased when compared to the previous results. EC levels were similar or decreased slightly at a majority of groundwater sites when compared to the July 2019 results.

The Calga Quarry weather station data recovery in September 2019 was approximately 100%. Data for September 2019 shows that rainfall recorded at the Calga Quarry was above the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for September.

The rainfall comparison is provided below:

Calga Quarry 147.8 mm
BOM Peats Ridge* NA
BOM Gosford* 112.6 mm
BOM Peats Ridge Long term mean for September* 69.1 mm

Note: Differences in the daily rainfall readings between BOM and the Calga station may occur due to BOM stations reporting rainfall at 9am and the Calga station recording rainfall at midnight.

^{*}Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

Sampling Program

Hanson Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (EPA) licence and Environmental Management Plans. CBased Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. CBased Environmental commenced monitoring from the April 2006 monitoring period.

Dust deposition gauges are operated to the Australian Standard <u>AS3580.10.1</u> "*Methods for sampling and analysis of ambient air method. Determination of particulates- deposited matter- gravimetric method*". Sampling is undertaken every 30 +/- 2 days and each gauge is analysed for insoluble solids and ash residue. The results are reported as g/m².month.

Surface waters are sampled in accordance with Australian Standards <u>AS5667.1</u> "Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples", <u>AS5667.6</u> "Water quality sampling—guidance on sampling of rivers and streams" and <u>AS5667.4</u> "Water quality sampling—guidance on sampling from lakes, natural and man-made". Surface water monitoring sites include local streams and dams. Basic analysis including pH, Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids and Total Oil and Grease is conducted monthly at Sites A and F (dams) and when Sites B, C and D are flowing. Additional samples are collected when daily rainfall exceeds 50mm.

Groundwaters are sampled in accordance with Australian Standards <u>AS5667.1</u> "Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples" and <u>AS5667.11</u> "Water quality sampling—guidance on sampling of ground waters". Groundwater monitoring sites are sampled bi-monthly for depth and water quality. Groundwater monitoring loggers continuously record water levels in a selection of bores.

Meteorological monitoring is conducted at the quarry and displayed on the site computer with a real-time display. Metrological parameters are measured according to Australian Standard <u>AS3580.14</u> "Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring applications"

The weather station has the following sensor configuration;

- Air temperature
- Humidity
- Rainfall
- Atmospheric pressure
- Evaporation
- Solar radiation
- Wind speed
- Wind direction

CBased Environmental continued to operate the monitoring equipment and utilise site collections at their existing locations.

The locations of monitoring points are provided in **Figure 1**.

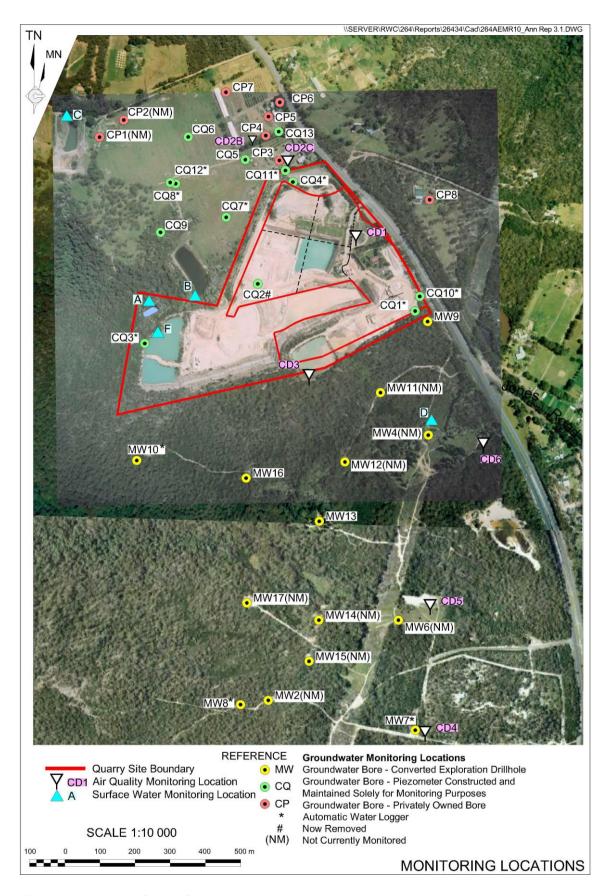


Figure 1: Hanson Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for September 2019 and the project 12-month rolling average. Results are in g/m².month.

Table 1: Dust Deposition results: 30 August – 1 October 2019 (32 days)

Site	Monthly Insoluble Solids (g/m².month)	Monthly Ash Residue (g/m².month)	Monthly Combustible Matter (g/m².month)	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids (g/m².month)
CD1	12#	11.0	1.0	92	1.9
CD2c	1.1	0.5	0.6	45	1.4
CD3	2.2	1.5	0.7	68	1.4
CD4	1.2	0.6	0.6	50	1.2
CD5	0.4	0.1	0.3	25	1.2
CD6	1.0	0.4	0.6	40	1.4

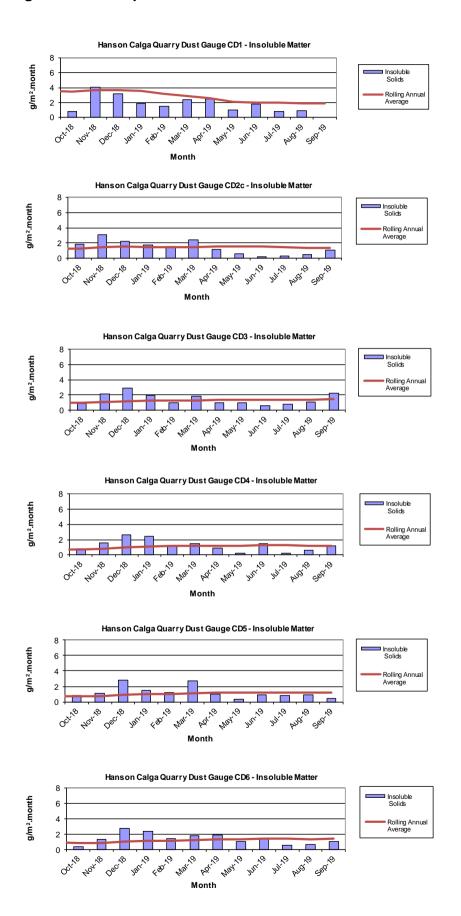
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m².month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from September 2018 to August 2019.

Advised by client that funnel had fallen out as the plastic lid was UV perished / damaged. Funnel and damaged lid placed back into the glass jar, unknown period that the funnel was laying on the ground. UV lid subsequently replaced by CBased during dust gauge collection. Gauge was non-compliant for an unknown period during the month (funnel not installed). Result reported for information purposes with result excluded from rolling annual average.

CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air Quality Management Plan. CD4 was installed on 3 October 2006, to gauge air quality impacts to the south of the site operations, as were CD5 and CD6 which were installed on the 14 December 2006. CD2b was discontinued at the end of January 2010 due to contamination of the gauge by non-quarry related vehicle movements on a track adjacent to the gauge. The replacement gauge, CD2c, was located on a rehabilitated section of land between the extraction area and adjacent resident.

Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The laboratory analysis is provided in **Appendix 1**.

Figure 2: Dust Deposition Charts



2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 1 October 2019 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

Table 2: Monthly surface water monitoring – September grab sample results

Site	Observed Flow Rate	Water Colour	Turbidity	рН	EC (μS/cm)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
Α	Dam	Clear	Clear	6.42	83	60	<5	<5
В	Trickle	Clear	Clear	6.6	138	78	14	<5
C1	Dam	Clear	Clear	6.41	101	60	8	<5
C2	Steady	Clear	Clear	5.88	111	64	<5	<5
D			S	till / No f	low			
F	Dam	Clear	Clear	6.72	81	62	19	<5

Samples were collected at sites A, B, C1, C2 and F. D was not flowing at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any sites in September 2019.

2.2.1 Non-Routine Surface Water Sampling

The following non-routine sampling was undertaken by Hanson staff in September 2019;

- Dam 1 (A), Dam 7B/C, Dam 13 (B), Point D Creek and Point C Spillway sampled 18 and 19 September 2019.
- Discharge Dam 1 (A) sampled 9, 11, 17, 23 and 30 September 2019;

Laboratory analysis certificates are provided in **Appendix 1.**

2.3 Groundwater Monitoring

Bi-monthly groundwaters were sampled on 1 October 2019. Water quality tests for pH and electrical conductivity were conducted by CBased Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (+/- 0.1 pH units) and Electrical Conductivity (+/- 5%) was obtained between samples. Data is displayed in **Table 3** and **Figures 3 to 6**.

Groundwater depth generally decreased when compared to July 2019, with water moving towards the surface. pH at all sites is in the acidic range and generally remained similar or slightly decreased when compared to the previous results. EC levels were similar or decreased slightly at a majority of groundwater sites when compared to the July 2019 results.

Dataloggers were also downloaded in September 2019 and emailed to site separately. No data was downloaded from CQ7, CQ8, CQ10 and CQ12 as no access was available to site as owner was not home.

Bi-monthly groundwater monitoring is next scheduled for November 2019.

Table 3: Groundwater Quality Data

Reference	Bore	Туре	Depth to water TOC (m) April 2006	Depth to water TOC (m) This report	pH This report	Electrical Conductivity (μS/cm) This report
CQ3	Voutos	* Monitor	10.53	10.67	6.32	111
CQ4	Voutos	* Monitor	8.78	11.18	5.31	133
CQ5	Gazzana	DIP Only	8.69	No ac	cess owner not he	ome
CQ6	Gazzana	DIP Only	16.00	Cove	red over in paddo	ock
CQ7	Gazzana	* Monitor	6.89	No ac	cess owner not ho	ome
CQ8	Gazzana	* Monitor	11.03	No ac	cess owner not ho	ome
CQ9	Gazzana	DIP Only	10.10		Blocked	
CQ10	Voutos	* Monitor	NI	No ac	cess owner not ho	ome
CQ11S	Gazzana	* Monitor	NI	11.96	5.00	149
CQ11D	Gazzana	* Monitor	NI	12.92	4.85	143
CQ12	Gazzana	* Monitor	NI	No ac	cess owner not he	ome
CQ13	Kashouli	* Monitor	NI	13.60	4.12	162
CP3	Gazzana	Domestic	10.40		Removed	
CP4	Kashouli	Domestic	13.63		Blocked	
CP5	Kashouli	Domestic	16.61	4.30	5.39	124
CP6	Kashouli	Domestic	16.27	9.84	4.10	147
CP7	Kashouli	Production	8.56	1.84	4.69	94
CP8	Rozmanec	Domestic	22.17	22.32	5.14	121
CP13	W P White	Domestic		11.86	4.99	157
CP15	32 Polins Road Calga	Domestic		2.24	5.27	178
MW7	Rocla Bore	* Monitor	15.76	14.50	6.72	46
MW8	Rocla Bore	* Monitor	9.82	7.44	5.10	68
MW9	Rocla Bore	* Monitor	22.44	23.94	4.23	86
MW10	Rocla Bore	* Monitor	15.41	10.37	4.94	111
MW13	Rocla Bore	DIP Only	NI	7.55	3.92	105
MW16	Rocla Bore	DIP Only	NI	8.21	4.89	106
MW17	Rocla Bore	DIP Only		9.80	4.53	116

Notes:

TOC = Water level measured from top of bore case to water.

NM = Not Monitored – unable to sample water due to non-operational pump.

NR = Not Required by resident.

NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

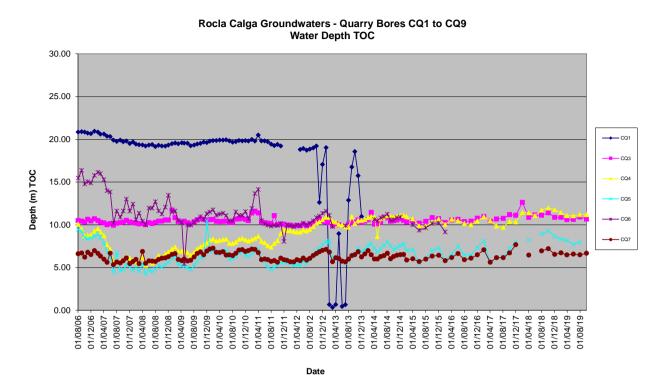
Shading is used to indicate the following trends in water depth (compared to the last reading):

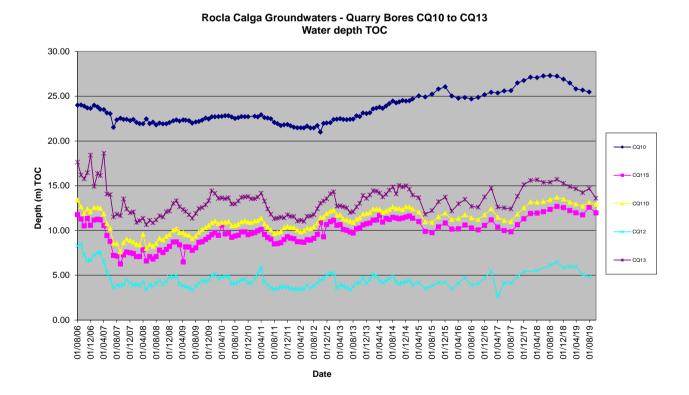
Increase to ground water depth (water moved away from surface)
Decrease to ground water depth (water moved towards surface)
Stable water depth (+/- 0.01m)

Available groundwater loggers were downloaded and will be forwarded to the Hanson Calga Quarry groundwater consultant.

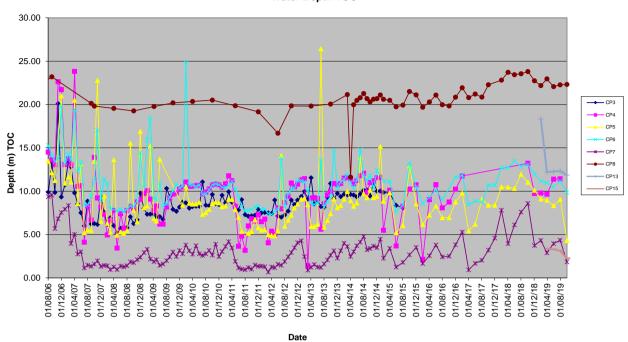
^{* =} Logger Installed.

Figures 3 to 6: Groundwater Depth Charts.

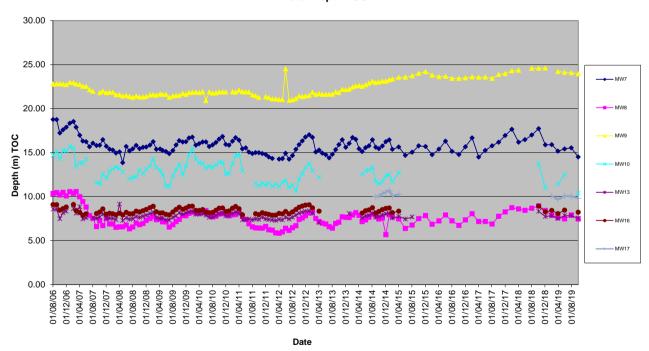




Rocla Calga Groundwaters - Quarry Bores CP3 to CP8 Water Depth TOC



Rocla Calga Groundwaters - Quarry Bores MW7 to MW17 Water Depth TOC



2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in September 2019 was approximately 100%.

The weather station data follows and includes:

- Monthly data numerical summary;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception; and
- Wind rose (frequency distribution diagram of wind speed and direction).

An annual calibration was undertaken on the weather station during April 2019 and is next due in April 2020.

Monthly weather statistics from the nearby Bureau of Meteorology (BOM) at Peats Ridge station are no longer available. However, the long-term rainfall mean is available via a link on the Gosford BOM Daily Weather Observation page.

Data for September 2019 shows that rainfall recorded at the Calga Quarry was above the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for September.

The rainfall comparison is provided below:

Calga Quarry 147.8 mm
BOM Peats Ridge* NA
BOM Gosford* 112.6 mm
BOM Peats Ridge Long term mean for September* 69.1 mm

NA = Not Available

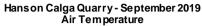
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

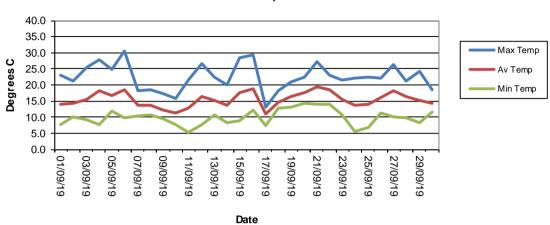
2.4.1 Monthly Meteorological Data Summary

Summary Sep-19 Hanson - Calga

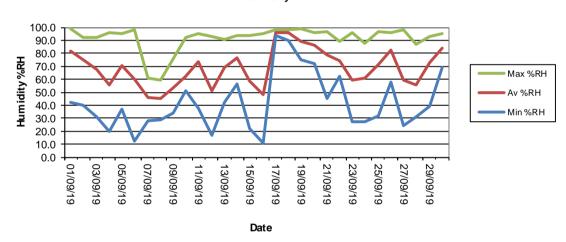
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	AvWS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/09/2019	7.6	14.1	23.1	42.0	81.7	99.0	0.0	3.1	0.0	1.1	6.7	7.7	22.6	1014.4	1017.1	1019.7	0.0	209.2	751.0	74.1	88.9	97.5
2/09/2019	10.2	14.2	21.2	40.0	75.4	92.0	0.0	3.5	0.0	1.5	12.1	10.2	20.3	1013.6	1014.9	1016.7	0.0	210.6	804.0	77.9	89.6	100.0
3/09/2019	9.1	15.6	25.4	31.0	67.7	92.0	0.0	3.7	0.0	1.0	7.2	9.3	24.5	1010.5	1013.2	1015.9	0.0	210.9	779.0	81.4	93.2	100.0
4/09/2019	7.8	18.2	27.9	20.0	55.8	96.0	0.0	4.5	0.0	1.3	8.5	7.9	26.4	1007.7	1011.0	1013.0	0.0	213.2	773.0	73.8	88.8	100.0
5/09/2019	11.9	16.8	24.8	37.0	70.4	95.0	0.0	3.7	0.0	1.2	8.5	11.9	23.9	1009.3	1011.3	1014.1	0.0	209.6	761.0	71.3	87.0	96.2
6/09/2019	9.7	18.5	30.6	12.0	60.3	98.0	0.6	5.5	0.0	3.5	20.6	8.4	28.6	993.9	1001.7	1009.7	0.0	190.5	791.0	63.1	83.7	100.0
7/09/2019	10.3	13.6	18.1	28.0	45.7	61.0	0.0	6.6	2.2	6.2	17.9	7.6	15.9	1000.8	1004.8	1008.1	0.0	224.8	805.0	92.4	96.6	100.0
8/09/2019	10.7	13.6	18.6	29.0	45.0	59.0	0.0	5.7	2.2	4.8	12.5	8.0	16.5	1006.1	1008.0	1010.1	0.0	220.2	800.0	92.4	95.9	99.7
9/09/2019	9.6	12.2	17.2	34.0	53.4	76.0	0.8	4.7	1.8	4.8	14.8	7.1	15.3	1005.0	1009.7	1017.1	0.0	195.2	934.0	75.7	88.9	97.5
10/09/2019	7.8	11.2	15.7	51.0	62.6	92.0	0.0	3.0	0.0	2.4	11.2	6.2	14.7	1017.1	1021.8	1026.9	0.0	136.1	671.0	68.5	92.0	98.4
11/09/2019	5.4	12.7	21.5	38.0	73.8	95.0	0.0	3.6	0.0	1.4	8.0	5.5	20.4	1024.0	1025.9	1028.6	0.0	226.5	806.0	84.9	92.4	100.0
12/09/2019	7.8	16.5	26.6	17.0	51.1	93.0	0.0	4.1	0.0	1.3	8.5	7.9	24.9	1013.7	1018.1	1023.9	0.0	194.4	825.0	65.9	87.6	100.0
13/09/2019	10.6	15.2	22.4	42.0	68.7	91.0	0.0	3.5	0.0	1.3	7.6	10.7	22.1	1014.7	1017.9	1021.5	0.0	198.9	963.0	74.8	92.4	100.0
14/09/2019	8.2	13.7	19.9	56.0	76.3	94.0	0.0	3.1	0.0	1.2	8.5	8.2	19.6	1015.4	1019.0	1021.3	0.0	187.4	875.0	83.3	92.6	97.5
15/09/2019	8.8	17.7	28.4	22.0	58.7	94.0	0.0	4.4	0.0	1.2	5.8	8.8	26.9	1014.6	1017.4	1020.7	0.0	227.4	825.0	85.5	92.5	97.2
16/09/2019	12.3	18.7	29.2	11.0	48.2	95.0	1.0	4.2	0.0	2.0	10.7	12.1	27.2	1008.7	1013.3	1017.6	0.0	161.7	942.0	73.5	91.7	100.0
17/09/2019	7.3	10.9	13.2	94.0	96.1	98.0	64.0	0.3	0.9	2.8	11.6	5.1	13.4	1016.3	1018.1	1020.3	0.0	21.9	137.0	75.4	86.6	95.3
18/09/2019	12.9	14.6	18.1	90.0	96.2	98.0	78.2	0.7	0.0	2.2	12.1	11.7	18.6	1019.1	1020.8	1022.6	0.0	45.0	447.0	75.1	89.2	100.0
19/09/2019	13.1	16.4	20.8	75.0	89.5	99.0	2.6	2.3	0.0	2.7	9.4	13.1	20.9	1021.0	1022.5	1024.0	0.0	120.8	747.0	53.9	78.1	92.1
20/09/2019	14.4	17.6	22.3	72.0	85.9	96.0	0.0	2.9	0.0	3.6	10.7	13.5	22.5	1018.8	1021.4	1023.9	0.0	145.3	752.0	65.9	82.4	100.0
21/09/2019	13.9	19.3	27.1	45.0	79.0	97.0	0.0	3.3	0.0	1.6	9.8	13.9	26.7	1013.9	1016.6	1019.4	0.0	176.5	804.0	81.4	89.5	94.6
22/09/2019	13.9	18.4	23.1	62.0	74.2	89.0	0.2	2.9	0.0	1.6	7.2	14.0	23.2	1013.5	1016.7	1019.4	0.0	142.2	895.0	90.5	96.3	100.0
23/09/2019	10.8	15.5	21.6	27.0	59.7	96.0	0.0	5.0	0.0	2.5	13.0	10.8	19.3	1016.7	1019.6	1022.9	0.0	237.4	947.0	71.3	93.4	100.0
24/09/2019	5.5	13.6	22.1	27.0	60.9	88.0	0.0	4.4	0.0	1.2	7.6	5.6	20.8	1020.0	1022.6	1024.6	0.0	257.0	879.0	84.2	92.0	100.0
25/09/2019	6.8	14.0	22.5	32.0	71.4	97.0	0.2	4.1	0.0	1.1	9.4	6.8	21.2	1021.7	1023.6	1025.3	0.0	256.2	878.0	71.9	93.0	100.0
26/09/2019	11.2	15.9	22.1	58.0	82.7	96.0	0.0	3.2	0.0	1.8	9.8	11.2	21.6	1018.4	1021.2	1024.0	0.0	196.9	989.0	68.5	87.3	100.0
27/09/2019	10.2	18.2	26.2	24.0	59.6	98.0	0.0	4.8	0.0	1.4	8.5	10.3	24.9	1010.4	1014.2	1018.4	0.0	244.5	906.0	65.9	86.3	100.0
28/09/2019	9.9	16.3	21.1	31.0	55.8	87.0	0.0	4.8	0.0	1.9	10.3	9.9	19.8	1009.0	1012.9	1017.0	0.0	250.6	894.0	72.6	86.4	95.9
29/09/2019	8.3	15.3	24.3	39.0	72.7	93.0	0.0	4.2	0.0	1.3	8.0	8.4	23.6	1012.0	1015.3	1018.3	0.0	253.7	978.0	74.8	89.7	98.7
30/09/2019	11.7	14.2	18.4	69.0	84.0	95.0	0.2	1.6	0.0	0.9	8.9	11.8	18.2	1017.3	1021.5	1026.5	0.0	88.6	667.0	72.2	90.7	97.8
Monthly	F 4	15.4	30.6	11	60	00	147.0	111.2	0	2.1	20.6	F 1	20.6	002.0	1016.4	1029.6	0	100 /	090	F2 0	90.9	100
Monthly	5.4	15.4	30.6	11	69	99	147.8	111.3	0	2.1	20.6	5.1	28.6	993.9	1016.4	1028.6	0	188.4	989	53.9	89.8	100

2.4.2 Monthly Weather Charts

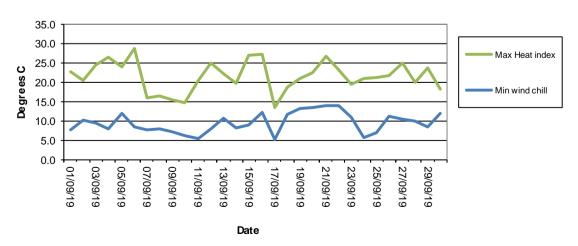




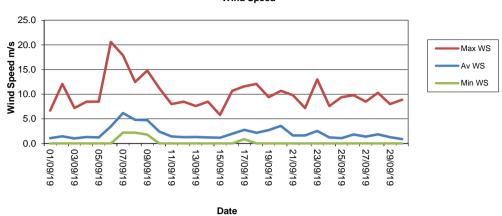
Hans on Calga Quarry - September 2019 Hum idity



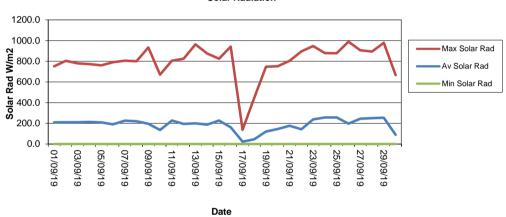
Hanson Calga Quarry - September 2019 Heat Index/Wind Chill



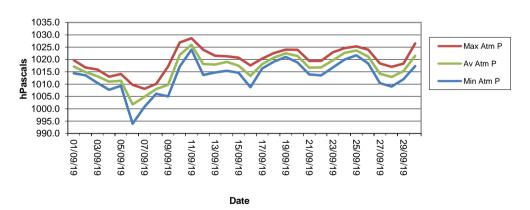




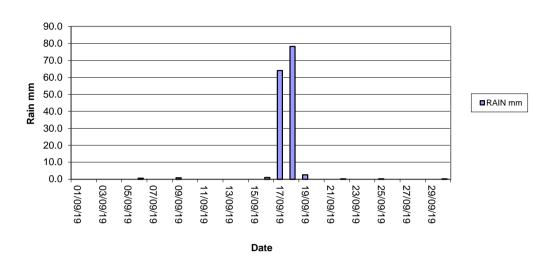
Hanson Calga Quarry - September 2019 Solar Radiation



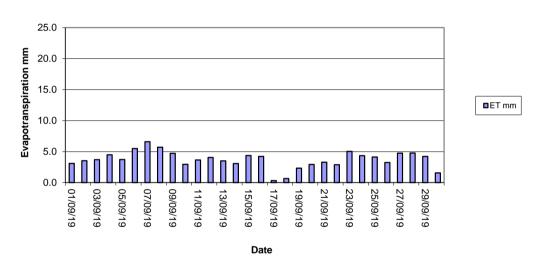
Hanson Calga Quarry - September 2019 Atmospheric Pressure



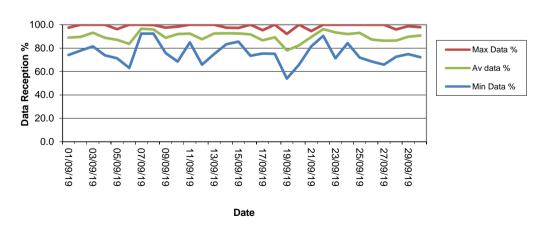
Hanson Calga Quarry - September 2019 Rainfall



Hanson Calga Quarry - September 2019 Evapotranspiration

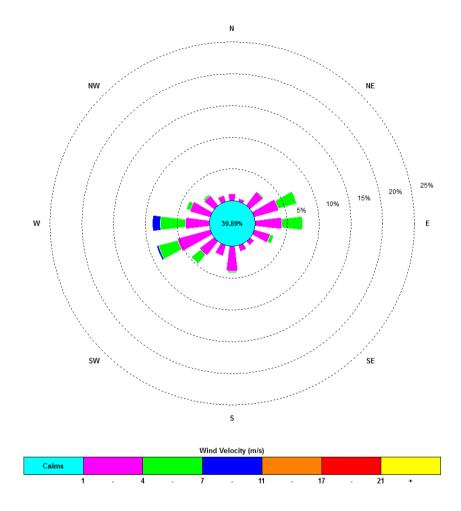


Hanson Calga Quarry - September 2019 Data Reception



2.4.3 Monthly Windrose Plot

Frequency plot of the average wind speed and average direction over each 15-minute sampling period. Wind is considered to be calm when at less than a 15-minute average of 1m/s.



0:00, 1 September 2019 - 23: 45, 30 September 2019

The predominant winds were from the W, with most frequent, strongest winds from the W. The maximum wind speed was 20.6 m/s from the WNW.

Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates



Client: Hanson Calga Quarry

Date Installed: 30-8-19

Sampled By: Leesa + Matt

Site	Time	Water		ole Material (🗸 = s		nod etc)	Water	Water	Stand Level	Funnel Level	New Funnel		Comments
	Collected	Level (mL)	Insects	Bird droppings	Vegetation	Dust	Turbidity	Colour	(Y/N)	(Y/N)	Diameter (mm)		
CD1	10.30	2000				1	©s t	O Bn Gn Gy	7	4	_	See	Comment
CD2C	12.500	2000					©s т	(C)O Bn Gn Gy	7	Y	~		
CD3	16-10	2000			/			© Bn Gn Gy		У	_		
CD4	1-40	2000	11/					O Bn Gn Gy		4			
CD5	2.10	2000	/		,	1	CST	O Bn Gn Gy	Υ	Y	_		
CD6	2.15	2000		✓		* /	©s t	© Bn Gn Gy	Y	4	_		
	ļ												
													N-
				-									10 ago -

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Colourless, O=Orange, Bn=Brown, Gn=Green, Gy = Grey (CIRCLE)

Report broken funnels and replacement diameters

Signed:

advised by itient that furnall was removed from Gauge and Client re-installed.

Hanson Calga DDG_FS_COC_V4

CHAIN OF CUST	ODY DO	CUN	ENTAT	ION											1
CLIENT: CBased Environmental Pt							LARC	DAT	OBV	PATCH NO.:	party of the party and	(tem) of a telephone	with the total country of the property of the		Australian Laboratory
POSTAL ADDRESS: 47 Boomeran	g St CESSNOC	K NSW 23	325					PLER		Ceesa L	- A A - A				Services Pty Ltd
SEND REPORT TO: monitoringresults@cbased.com.au		SEND IN	NVOICE TO: acc	counts@cbased.com.au,											
DATA NEEDED BY: 7 working days	•	REPOR	NEEDED BY:	7 working days						MAT: HARD: Yes			ults@cbased.com.au		
PROJECT ID: Hanson Calga Dusts		: SYBQ 40	3-18					EVEL			FAX:	DISK		E-MAIL: Yes	
P.O. NO.:				ORAGE OR DIPOSAL:			QC L	LVLL	-	QCS1:	QCS2:			QCS4:	
FOR LAB USE ONLY A TIMA						_	- "		1 #	#I I I I		TI	ANALYSIS REQUIRED	1	
P.O. NO.: FOR LAB USE ONLY COOLER SEAL							Soldis	e e	Combustable Matt	200					
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Broken Intact							Insoluable	& a	Si id	sng		1 1			
COOLER TEMP: deg C							uso	Ash	Ec	<u> </u>					A Access of
SAM	IPLE DATA			CONTAINER I	DATA		-	-	1		++	+-			NOTES
SAMPLE ID	MATRIX	DATEC	N DATE OFF						+		++	++-	Environmand		
CD1	Dust		19 1-10-19		.40.		- V	-	-	++++	\rightarrow	+-	Environmental D	roisivi	
CD2c	Dust	20 0	11 (10 1)				х	х	Х				Newcastle		
CD3	Dust	1	1				Х	X	X			1	Work Order Refer	rence	
CD4	Dust		+ +				X	Х	х			1	EN1906	913 =	
CD5	Dust	1					X	×	X			++			
CD6	Dust					-	X	Х	X			+			
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NAME :			DATE:				NAME						TIME: 1.16 PM	Λ	
OF:			TIME:				OF:		_				DATE:		TRANSPORT CO. NAME.
*Container Type and Preservative Co	odes: P = Neutr	al Plastic: I	N = Nitric Acid P	reserved: C = Sodium Hydr	ovide Dre	acon/od	UI - C	alvant	10/-	ahad Add Division	-		TIME:		
VC = Hydrochloric Acid Preserved Vi	ial; VS = Sulfurio	Acid Pres	served Vial: BS =	Sulfuric Acid Preserved (Class Pot	Ho: 7 -	7ino A	ootete	vvas	sned Acid Rinced Jar	; S = Solvent	Washed A	cid Rinced Glass Bottle;	-	
O = Other.				Canano / Iola / 1030/ Vea (JIASS DUL	ile, Z -	ZIIIC AC	Setate	Pres	served Bottle; E = ED	TA Preserve	d Bottles;	ST = Sterile Bottle;		
			İ		10.00										

AUSTRALIAN LABORATORY SERVICES P/L



CERTIFICATE OF ANALYSIS

Work Order : EN1906913

Client : CBASED ENVIRONMENTAL PTY LTD

Contact : All Deliverables

Address : Unit 3 2 Enterprise Cres

Singleton NSW 2330

Telephone : +61 02 6571 3334
Project : Hanson Calga Dusts

Order number : ---C-O-C number : ----

Sampler : Leesa King, Matt Wilkin

Site

Quote number : SYBQ/403/18 - COMPASS

No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 4

Laboratory : Environmental Division Newcastle

Contact :

Address : 5/585 Maitland Road Mayfield West NSW Australia 2304

 Telephone
 : +61 2 4014 2500

 Date Samples Received
 : 02-Oct-2019 13:16

 Date Analysis Commenced
 : 03-Oct-2019

Issue Date : 09-Oct-2019 19:09



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Dianne Blane Laboratory Coordinator (2IC) Newcastle - Inorganics, Mayfield West, NSW

Page : 2 of 4 Work Order : EN1906913

Client : CBASED ENVIRONMENTAL PTY LTD

Project : Hanson Calga Dusts

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.

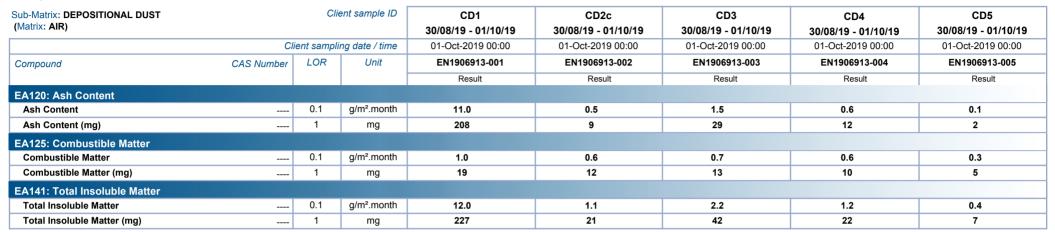


Page : 3 of 4
Work Order : EN1906913

Client : CBASED ENVIRONMENTAL PTY LTD

Project : Hanson Calga Dusts

Analytical Results



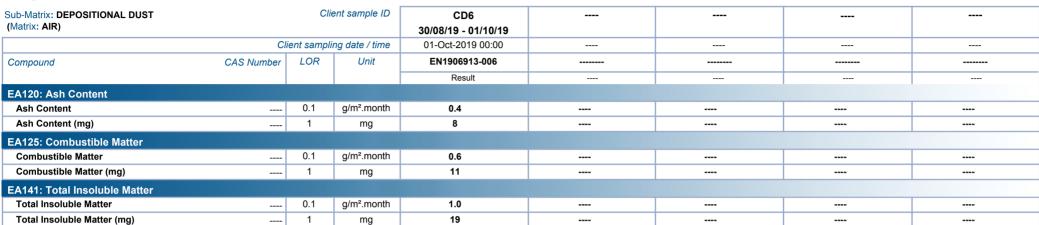


Page : 4 of 4
Work Order : EN1906913

Client : CBASED ENVIRONMENTAL PTY LTD

Project : Hanson Calga Dusts

Analytical Results







1-10-19

Client:

Hanson Calga

Project:

SI	RFA	CF	WA	TE	RS
					10

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
4	Dam	No	9.35	1x 250ml GP, 1x 500mL GP, 1x PG	©S T	CLO O B G	
В	Trickle	20	8.50	1x 250ml GP, 1x 500mL GP, 1x PG	O ST	CLO O B G	
C1	Pam	No	10-30	1x 250ml GP, 1x 500mL GP, 1x PG	QST	(C)LOOBG	
C2	Steady	NO	10.40	1x 250ml GP, 1x 500mL GP, 1x PG	O S T	O LO O B G	
D	SHTU			1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
F	DAM	NO	9.15	1x 250ml GP, 1x 500mL GP, 1x PG	© ST	Q LO O B G	
							.,

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

Sampled by: Leesa + Max

CLIENT: CBased Environmental Pt	Ltd				IAD	DRAT	TORY I	RATO	ש אמ	Action of state the		Secretary Control	维力,外域影響 。	Para production of the second		A RESIDENCE	The state of the s	Australian Laboratory
POSTAL ADDRESS: PO Box 245 C		SW 2325								ımental F	Oty I to	Leesc	L \00	att-			177 48	Services Pty Ltd
SEND REPORT TO: nonitoringresults@cbased.com.au				renae.mikka@cbased.com.au;			26571		ITVITOI				ults@cbased				-	
DATA NEEDED BY: 5 working days				BY: 5 working days			FORM		UADD:					IG:			\/	
PROJECT ID: Hanson Quarry SW	QUOTE NO.:			br. 5 Working days		EVE		QC:		168	FAX:	DISK		TIN BOARD:		E-MAIL:	Yes	
P.O. NO.:				S/STORAGE OR DIPOSAL:	QUI	LVLI		QU	31.	_	QCS2		QCS3: Ye		QC	S4:		
OR LAB USE ONLY COOLER SEAL ()													ANALYSIS	REQUIRED	1			
es No	Total unless	specified																
roken 🌎 🐧 Intact							1 0	(0	O									
OOLER TEMP: deg.C					표 공	日 日	TSS	TDS	+									NOTES
SAMPL	E DATA			*CONTAINER DATA														NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE N	D.													
Α	Water	1-10-10	1 9-35	1x 250mlGP,1x 500mLGP,1xPG	х	х	х	х	х						+		+	
В	Water			01x 250mIGP,1x 500mLGP,1xPG	х	х	X	х	х					-	Enviro	nment	al Di	
C1	Water		10-30	1x 250mlGP,1x 500mLGP,1xPG	х	х	х	х	х					-	Sydne	ev.	ai Di	T/2
C2	Water		10-40	1x 250mlGP,1x 500mLGP,1xPG	х	x	X	х	х					+	Wor	k Order I	Refere	DC6
D	Water			1x-250mIGP,1x-500mLGP,1xPG	X	X	×	-X-	_X-						ES	519:	32	70
F	Water		9-15	1x 250mlGP,1x 500mLGP,1xPG	х	х	X	х	x			1 1 1 1		-		- 100		/ 12
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AUSTRALIAN LABORATORY SERVICES P/L



CERTIFICATE OF ANALYSIS

Work Order : ES1932172

Client : CBASED ENVIRONMENTAL PTY LTD

Contact : All Deliverables

Address : Unit 3 2 Enterprise Cres

Singleton NSW 2330

Telephone : +61 02 6571 3334
Project : Hanson Quarry SW

Order number : ----

C-O-C number : ---Sampler : Leesa + Matt

Site

Quote number : SYBQ/403/18 - COMPASS

No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 02-Oct-2019 13:18

Date Analysis Commenced : 02-Oct-2019

Issue Date : 09-Oct-2019 10:32



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW Neil Martin Sydney Inorganics, Smithfield, NSW Chemistry, Newcastle West, NSW

Page : 2 of 2 Work Order : ES1932172

Client : CBASED ENVIRONMENTAL PTY LTD

Project : Hanson Quarry SW

General Comments

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LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Α	В	C1	C2	F
	Cli	ient sampli	ng date / time	01-Oct-2019 09:35	01-Oct-2019 08:50	01-Oct-2019 10:30	01-Oct-2019 10:40	01-Oct-2019 09:15
Compound	CAS Number	LOR	Unit	ES1932172-001	ES1932172-002	ES1932172-003	ES1932172-004	ES1932172-005
				Result	Result	Result	Result	Result
EA005: pH								
pH Value		0.01	pH Unit	6.42	6.60	6.41	5.88	6.72
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	μS/cm	83	138	101	111	81
EA015: Total Dissolved Solids dried at 1	80 ± 5 °C							
Total Dissolved Solids @180°C		10	mg/L	60	78	60	64	62
EA025: Total Suspended Solids dried at	104 ± 2°C							
Suspended Solids (SS)		5	mg/L	<5	14	8	<5	19
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5





Date: (/(0/\9

Client : Project : Hanson Calga Bi-Annual Bores **GROUNDWATERS**

Site	Time	DEPTH	Typical	Odour	Water	Water		1		2	Bottles	Downloaded	Comments
			Depth (m)		Turbidity	Colour	pН	EC	pН	EC	(Apr/Oct)	Logger? (Y/N)*	*1.0200 0.00
CQ3	9.05	10.67	10.98	N.L	CST	C LO OB G	6-26	109-5us	6.32	110.6us	1x 250ml GP, 1x 500mL GP, 1RP	V	
CQ4	1230	11-18	11.49	NIL	CS T	©LOOB G	5.34	137.7.05	5.31		1x 250ml GP, 1x 500mL GP, 1RP	1	
CQ5			8.59		CST	CLOOBG				126.00)	1x 250ml GP, 1x 500ml GP, 1RP		no Access Owner in
CQ6				-	CST	CLOOBS					4x 250ml GP, 1x 500ml GP, 1RP		Covered over in po
CQ7	40.474		6.73		CST	CLOOBG					1x 250ml GP, 1x 500mL GP, 1RP		HOACESS JOWNEY
CQ8	T.V.		7.44	NIL	CST	CLOOBG					1x 250ml GP 1x 500ml GP, 1RP		NO Acress \$
CQ9					CST	CLOOBC					1y 250ml GP 1y 500ml GP 1PP		Blocked
CQ10			26.87		CST	CLOOBG					1x 250ml GP, 1x 500ml, GP, 1RP		1. 4
CQ11S	12.15	11.96	12.26	NIC	©s ⊤	C)OOBG	41.97	201181	5.00	14856	1x 250ml GP, 1x 500mL GP, 1RP	V	No Access owner a
CQ11D	12.10	12.92	13.31	1	O S T	(C)LOOBG		151.40			1x 250ml GP, 1x 500mL GP, 1RP	7	
CQ12	16.10		5.98		CST	CLOOBG	1.00	6.3(. (0	143	1 15.107	1x 250ml GP, 1x 500mL GP, 1RP		1) A== 05 (D)
CQ13	11.55	13.60	15.28	No	(CST	(OLOOBG	4-11	161.40	4.12	162-3us		V	No Access Duner
CP3					CST	CLOORG	, ,,	161.40	112	inc jus	1x 250ml GP, 1x 500ml GP, 1RP		0
CP4	12.00	5.04	10.6		CST	CLOORG					1x 250ml GP, 1x 500mL GP, 1RP	1	Removed.
CP5	11-45	4.30	10.27	NIL	©S T	(C).00BG	5.36	127.2w	5.39	124.4			Blocked
CP6	11.50	9.84	12.33	NIL	©S T	CLOOBG	4.20	147.20			1x 250ml GP, 1x 500ml GP, 1RP		
CP7	112-35	1.84	5.31	No	CST	O LOOBG	4.72	99-6us	4.69		1x 250ml GP, 1x 500mL GP, 1RP 1x 250ml GP, 1x 500mL GP, 1RP		
CP8	13.00	22.32	23.2	NIL	CST	C)OOBG	5.09		5-14				
CP13	11/00	11/25/0	15.27	No	CST	CLOO 6 G		153-74		163.60	1x 250ml GP, 1x 500mL GP, 1RP		
CP15	10-45	2.24	3.38	20	OST	CLOOBG	4.97				1x 250ml GP, 1x 500mL GP, 1RP		
MW7	1.35	14-50	16.33	No	C S)T	C LOOBG	5.32	181-84	5.27		1x 250ml GP, 1x 500mL GP, 1RP		
MW8	1.55	7.44	8.36	70	Øst	CLOOBG	6-84				1x 250ml GP, 1x 500mL GP, 1RP	7	
MW9	3.35	23.94	24.47	N14	CST	CLOOBG	5.15	69-74s	5-10		1x 250ml GP, 1x 500mL GP, 1RP	4	
VIVV10	2.55	10.37	12.04	NO		O LOOBG	4-24	87.1 ws	7-23		1x 250ml GP, 1x 500mL GP, 1RP	4	
VIVV13		7.35	7.85	70	© S T		7.99	112.445			manufacture of the control of the	4	
WW16	2-20				CST	CLOOBG	3.92		3.92		1x 250ml GP, 1x 500mL GP, 1RP		
VIVV 16 VIVV 17	2.05	9.21	8.41	200	O S T	⊘ LO O B G	5-00	105.00	4.89	105-945	1x 250ml GP, 1x 500ml GP, 1RP	THE RESERVE	

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE) pH/EC meter #: V 3 7 4 3

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

*If unable to download logger please provide comment/ explanation above

Signed:

Sampled by: Cesa + Matt

Spoke to share about no Access to the property to Access an the CQ bores.



CHAIN OF CUSTODY ALS Laboratory:

□ADELAIDE 21 Burma Road Pooraka SA 5005 Ph. 08 8350 0890 E: adelaide@atsplobal.com DRRISBANE 32 Shand Street Stafford OLD 4053 Ph. 07 3243 7222 E: samples.bricbene@atsplobal.com □GLADSTONE 46 Callemondah Drive Cinton OLD 4880 Ph. 07 7471 5500 E: glassbone@atsplob.com DMACKAY 76 Herbour Read Markay OLD 4740
Pt: 07 4944 0177 E: mackay@lafgloonl.com
DMELBOURNE 2-4 Westell Road Springvale VIC 3171
Ph: 03 8549 8900 E: samples melbourne@aksplobal.com
DMUDGEE 27 Sydney Road Mudgee NSW 2850
Pt: 02 6372 6735 E: mudge: mah@l@aksplobal.com

DNEWCASTLE 9/595 Maidand Rd Mayfield Wed NSW 2304 Ph. 02 4014 2500 E; semples newcayfie@alajdobal.com DNOWARA 413 Geary Place North Navan NSW 2541 m Ph: 024423 2083 E; newra@alajdobal.com DPERTH 10 Hod Way Malaya V/A 6000 Ph: 06 9209 7655 E; samples_perh@alajdobal.com

DWOLLONGONG 99 Kenny Street Wallongong NSW 2500 Ph. 02 4225 3125 E: portkembla@alsglobal.com

	production .											Here was the second	The state of the s
CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250			TURNAROUND REQUIREMENTS: Standard TAT (List due date): EDR-LABORATORY USE ONE AT (Grole)										ls≘ol Ar (erce)
OFFICE: .			(Standard	TAT may be longer for some tests e.g Ultra panics)	☐ Non SI	landard or urge	ent TAT (List	due date)		ority 10/09/201		Cusion/Sed Intact?	* 5
PROJECT: H	lanson Calga Quarry, Site Water Disch	arge Dam 1 (A)	ALS QUOTE NO.: SYBQ 222-18 PH: (02) 4375 1151						COC SEQUE	NCE NUMBER	R (Circle)	Cuspo) Sea Impo? Fredick / mizer 2 inch receipt?	
ROER NUM	BER: 4502621948								1			Random Sample Temper	dure of Receipt
PROJECT MA	ANAGER: Shane Pescud	CONTACT							1	1	1/	Omer comment."	Buck Laure (1922) 110 Sec. Sec. 1971
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Email Report	s to: shane.pescud@hanson.com.au &	monitoringresults@cbas	ed.com.a	W .	DATE/TIME	E: 9/09/2019		DATI	E/TIME: O	109/20	94	DATE/TIME:	DATE/TIME:
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Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; ORC = Nitric Preserved Plastic; SH = Sodium Hydroxide/Cd Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; F = Formaldehyde Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; H = HCl preserved; AB = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; HS = HCl preserved; AB = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; AG = Amber Glass; HS = HCl preserved; AB = HCl preserved Speciation bottle; AG = Amber Glass; AG = Amber Glas



CERTIFICATE OF ANALYSIS

Work Order : ES1928899

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address : BOOLLWARROO PDE

SHELLHARBOUR NSW, AUSTRALIA 2529

Telephone : 02 4375 1151

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1

(A)

Order number : 4502621948

C-O-C number : ----

Sampler : DALE WILCOX

Site : ---

Quote number : EN/333

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 09-Sep-2019 14:36

Date Analysis Commenced : 09-Sep-2019

Issue Date : 11-Sep-2019 10:42



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

Client

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Page : 2 of 2 Work Order : ES1928899

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)

ALS

General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	DISCHARGE DAM 1 (A) 09092019	 	
	Cli	ent sampli	ng date / time	09-Sep-2019 10:32	 	
Compound	CAS Number	LOR	Unit	ES1928899-001	 	
				Result	 	
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	8.53	 	
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	95	 	
EA015: Total Dissolved Solids dried at 18	80 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	63	 	
EA025: Total Suspended Solids dried at	104 ± 2°C					
Suspended Solids (SS)		5	mg/L	15	 	
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	

potrick



CHAIN OF CUSTODY

ALS Laboratory: please tick →

JADELAIDE 21 Burma Road Poorska SA 5095 Ph. 08 9159 0390 Et orlehide glasglobal.com

DBRISBANE 37 Shand Street Staffurd CLD 4153
Ph. 07 7243 7232 Et camples.brisbane glasglobal.com DGLADSTONE 46 Callemendah Drive Clinton GLD 4680 Ph. 97 7471 5693 L. gladstone Balsglobal com ☐M4CKAY 78 Harbour Road Maskay QLD 4740 Ph: 07 4944 0177 E. maskay ĝalsplobat.com

JMELBOURNE 2-4 Westal Road Springvale VIC 3171 Ph. 02 8549 6600 E. samnles melkourne@aisglobal.com JMUDGES 27 Sydney Road Mudgee NSW 2850 Ph. 02 6372 6735 E. mudgeo mali@akslobat.com

JINEWCASTLE 5/985 Mailland Rd Mayhaid West NSW 2304 Phr 02 4014 2500 El samples newcastle@nloqiobal cam LINOWRA 4.13 Génty Place North Novre NSW 2541 Phr 0/24423 2603 El novra@alsglotbat.com

PERTH 10 Hod Way Malags, WA 6090 Ph: 08 9209 7655 E: samples perth 2 alsolobal com

USYDNEY 277-289 Woodpark Road Smithfield NSW 2184 Ph 02 8744 8555 E samples sydney@alsolohal.com JTO7:NSVILLE 14-15 Deams Court Boble OLD 4818 Ph: C7 4796 0605 E: townswife sourcemental discolobation

DWOLLONGONG 99 Kenny Street Wollongong NSW 2500 Phr 02 4225 3125 E: portkembla@alsglobat.com

	Hanson Calga Quarry - 151 Peats Ridge	Rd Calga NSW 2250		TURNAROUND REQUIREMENTS: Standard TAT (List due date):										
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	rts to: shane.pescud@hanson.com.au &			RV .	DATE/TIM	E: 11/09/2011	9	DAT	E/TIME: U	25190	ON	DATE/TIME:		DATE/TIME:
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OMMENT	S/SPECIAL HANDLING/STORAGE OR DI	SPOSAL:												
ALS USE	SAMPLE DE MATRIX: SOCID (S)	TAILS WATER (W)		S GONTAINET INFOR	MATION .		ANALY Where Me	SIS REQUI	RED Including juired, specify	Total (unfilter	. Suite Codes ed bottle required).	s must be listed to attract sul uired) or Dissolved (field filt	te price) - ered bottle	Additional Information
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LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	H	EC	88.	TDS	Oil & Grease			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
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CERTIFICATE OF ANALYSIS

Work Order : ES1929257

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address

Client

Telephone : 02 4375 1151

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1

(A)

Order number : 4502621948

C-O-C number : ----

Sampler : SHANE PESCUD

Site : ---

Quote number : EN/333

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 11-Sep-2019 14:20

Date Analysis Commenced : 11-Sep-2019

Issue Date : 16-Sep-2019 11:00



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Page : 2 of 2 Work Order : ES1929257

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)

ALS

General Comments

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LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Discharge Dam 1 (A) 11092019	 	
	Clie	ent samplii	ng date / time	11-Sep-2019 09:30	 	
Compound	CAS Number	LOR	Unit	ES1929257-001	 	
				Result	 	
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	6.18	 	
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	93	 	
EA015: Total Dissolved Solids dried at 1	80 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	64	 	
EA025: Total Suspended Solids dried at	104 ± 2°C					
Suspended Solids (SS)		5	mg/L	17	 	
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	



CHAIN OF CUSTODY

LIADELAIDE 21 Bruma Road Pooraka SA 5005 Pt: 08 8369 0860 E: adelarice@alsglobal.com

J3RISBANE 32 Shanri Straet Stafford OLD 4063

Pt: 07 3245 7222 E: samples.brisbanc@alsglobal.com LIGLADSTONE 46 Callemondah Drive Clinton QLD 4680 ⊒MACKAY 76 Harbour Road Mackay QLD 4740 Ptr 07 4944 0177 E: mackay@afsglobal.com

DIMET BOURNE 2-4 Westali Roan Springvalle VIC 3171 Ph 03 8549 9800 E: samples melbourne@alsglobal.com DMUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 8735 E: mudges mail@alsglobal.com

ENSWCASTLE 5/585 Mailland Rd Mayfield West NSW 2304 Phy: 02-4014 2500 E. samples, nervoastic@alsolobal.com UNOWRA 4:13 Geary Place North, Norra NSW 2541 Phy: 024423 2053 Et nowra @atspobal.com

LIPERTH 10 Hod Way Malage WA 6090 Ph; 08 9209 7655 E: samples perth@alag*obal.com

OSYDNEY 277-289 Woodpark Road Smichfield NSW 2164 Fb 92 8784 8585 E. samples sydney & slogloba com Ph 97 4784 6000 E. samples sydney & slogloba com Ph 97 4786 6000 E. samples environmentatigalishbal com

DWOLLONGONG 99 Kenny Street Wollangong NSW 2500 Ph; 92 4225 3125 5; portkemble@alsglobal.com

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ROJECT MA	ANAGER: Shane Pescud	CONTACT	PH: (02) 4	375 1151				OF:	1			Other comment:	Maria Maria Maria		
AMPLER: D	ale Wilcox	SAMPLER I	MOBILE:	0425 290 692	RELINGUI	SHED BY:		RECE	IVED BY:	7		RELINQUISHED BY:	RECEIVED BY:		
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mall Invoive	to: nsw.accounts@hanson.com.au &	chanae.delany@hanson.d	com.au					11+	1909	lilog	•				
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ALS USE	SAMPLE DE MATRIX: SOLID (S)			CONTAINER INFORM	MATION		ANALYS Where Me	BIS REQUIR tals are req	ED including ulred, specify 1	SUITES (NB. Sult rotal (unfiltered bo required).	ttle requi	must be listed to attract suite price) red) or Dissolved (field filtered bot	lle Additional Information		
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	H	S	135	ат	Oil & Grease		Comments on likely contaminant level dilutions, or samples requiring specific analysis etc.		
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V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sodium Bisulphate Preserve



CERTIFICATE OF ANALYSIS

Work Order : ES1929967

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address

Client

C-O-C number

Telephone : 02 4375 1151

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1

(A)

Order number : ----

Sampler : Dale Wilcox

Site : ---

Quote number : EN/333

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 17-Sep-2019 13:20

Date Analysis Commenced : 17-Sep-2019

Issue Date : 19-Sep-2019 10:27



ISO/IEC 17025 - 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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- General Comments
- Analytical Results

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)



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LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Sub-Matrix: WATER (Matrix: WATER)	Client sample ID Client sampling date / time			Discharge Dam 1 (A) 17092019	 	
	Clie	ent samplii	ng date / time	17-Sep-2019 10:00	 	
Compound	CAS Number	LOR	Unit	ES1929967-001	 	
				Result	 	
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	6.35	 	
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	86	 	
EA015: Total Dissolved Solids dried at 18	80 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	72	 	
EA025: Total Suspended Solids dried at	104 ± 2°C					
Suspended Solids (SS)		5	mg/L	6	 	
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	



CHAIN OF CUSTODY ALS Laboratory: DATA LAIDE 21 Huma Scart Pooraka SA 5095 On 05 8359 0990 E. adelaide@aiso obaccom DPRISBANE 30 Shand Street Staffold OLD 4053 Pb. 07 3243 7222 El camples brisbane @anglobal com LIGLAGS ONE 36 Callemendal: Drive Clinton OI D 4380 Ph. 07 1471 9800 E. planstone & alcyllobel com

UMACKAY /8 Harnour Road Mackay OLD 47/10 Ph: 07 4944 0177 5: mackay a alsolohal com

ULIELBOURNE 2-1 Winstall Road Shringvale VIG 3171 Ph. C3 8549 9890 E. samples mellinume@alsglobel.com □NUTIGE E 27 Sydney Road bludger NSM 2850 7th 02 8372 0736 E, mudger mail € alsolobat.com

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ORDER NU	WBER: 4502621948			*				coc:	coc: 1				Random Sample Temperature on Receipt) Lips 17 TC.			
PROJECT N	ANAGER: Shane Pescud	CONTACT	PH: (02) 4	375 1151				OF:	1			Other	rcomment			
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Email Repo	rts to: shane.pescud@hanson.com	n.au & monitoringresults@cb	pased.com	n.au	DATE/TIN	IE: 18/09/201	9	DATE	E/TIME:			DATE/TIMI	E:	DATE/TIME:		
Email involv	e to: nsw.accounts@hanson.com.au	& chanae.delany@hanson.c	com.au											18/09/2019 11:45		
COMMENTS	SISPECIAL HANDLINGISTORAGE OF	R DISPOSAL:											190			
ALS USE	SAMPLE MATRIX: SOLID			CONTAINER INFOR	MATION !		ANALY Where Me	SIS REQUIR	RED including	Total (unfilter	ed bottle requ	s must be listed uired) or Disso	d to attract suite price) -	Additional Information		
4.004								requ	ired).		T Yes					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	#.	ű ű	SS.	₽S≻	Oil & Grease		Environm	Comments on likely contaminant levels, dilutions, or samples requiring specific QC		
1	Dam 1 (A)	18/09/2019 7:00am	w	1x P, 1x O&G		2	1	1	1	1	1		Sydney	der Reference		
2	Dam 7B/C	18/09/2019 7:15am	w	1x P, 1x O&G	•	2	1	1	1	- i	1	11 - 4	ES	der Reference 93010/2		
3	Dam 13 (B)	18/09/2019 7;35am	w	1x P, 1x O&G		2	1	1	1	1	1			a aug 100- (1)		
4	Point D Creek	18/09/2019 7:50am	w	1x P, 1x O&G	********	2	1	1	1	1	1					
5	Point C Spillway	18/09/2019 8:15am	w	1x P, 1x O&G	The Control of the Co	2	1	1	1	1	1					
	- 			100				γC =					Telephone:	51-2-8784 8555		
- Charles	· · · · · · · · · · · · · · · · · · ·											и ,				
	(4)				2000									Las established to the second		
					TOTA	10	5	5	5	5	5	5,1	had hid	F 6		

V= VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VB = VDA Vial Sodium Bisulphate Preserved; VB = VBA VIA Sodium Bisulphate Preserved; VB

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic



Work Order : ES1930102

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address : 20 Parker street Carrington

2294

Telephone : 02 4375 1151

Project : Hanson Calga Surafce Water Monitoring

Order number : 4502621948

C-O-C number : ----

Sampler : SHANE PESCUD

Site : ---

Quote number : EN/333

No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 18-Sep-2019 11:45

Date Analysis Commenced : 18-Sep-2019

Issue Date : 25-Sep-2019 11:32



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : Hanson Calga Surafce Water Monitoring

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- TDS by method EA-015 may bias high for sample 3 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Dam 1 (A)	Dam 7B/C	Dam 13 (B)	Point D Creek	Point C Spillway
	Cli	ent sampli	ng date / time	18-Sep-2019 07:00	18-Sep-2019 07:15	18-Sep-2019 07:35	18-Sep-2019 07:50	18-Sep-2019 08:15
Compound	CAS Number	LOR	Unit	ES1930102-001	ES1930102-002	ES1930102-003	ES1930102-004	ES1930102-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	5.87	5.91	6.41	5.96	6.00
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	μS/cm	84	82	66	48	92
EA015: Total Dissolved Solids dried at 18	30 ± 5 °C							
Total Dissolved Solids @180°C		10	mg/L	48	50	78	38	53
EA025: Total Suspended Solids dried at	104 ± 2°C							
Suspended Solids (SS)		5	mg/L	37	36	126	65	<5
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	5	<5	<5





CHAIN OF CUSTODY

ALS Laboratory: please tick →

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DMELBOURNE 2-4 Wastan Road Springvalo VIC 3171 Ph. 93 8549 9800 Et samples meticaurie ⊈inlaglobal cari LIYUDGEE 27 Sydney Road Mudges NSW 2850 Ph. 92 8272 6736 E. midges mail ∄alaglobal com

UNEWCASTLE 5:685 Maitland Rri Mayfeid West NSW 2304 Ph; 02:4014:2500 E; samples newcastle@aisgrobal.com UNOWRA 4:13 Gozry Place North Novra NSW 2541

Ph; 024433 2063 E: nowra@alsglobal.com

UPERTH 10 Hod Way Matiga WA 6090

Ph; 08 9209 7655 E: samples.perth@alsgrobal.com

USYIDNEY 277-289 Woodpark Road Smithhold NS.V 7164 2TDC/NSVI 2655E appelled Cyling Chile Chauser Pg. 07 4790 0600 E. townsville environmental & siglishal com-

LIWOLLONGONG 99 Kenny Street Wollangana NSV: 2500 Ph. 02 4225 3125 Er partkembra@alsglobel.com

CLIENT: Hans	son Calga Quarry - 151 Peats Ric		TURNA	ROUND REQUIREMENTS:	Standa	rd TAT (List di	ie date):	24000				Ectavistof.	Atomy U.S.	
OFFICE:	on saign waarij - ist reats nic	ARA UA Odilid HOLL ETA	(Standard	TAT may be longer for some tests e.g., Ultra		andard or urge		t due date\	pH res	sults 19/09/20	19			
	son Calga Surface Water Monito	ring	ALS OF		222-16	andard or dige	air IAI (Lis	cude date,	-	ENCE NUMBE		1007	- to build process	
ODDED NUMBE	R: 4502621948		The die	0.12.110.11	77-77			coc:				Pendon Seni	o Tompuratile of	
	AGER: Shane Pescud	CONTACT F	H: (02) 4	375 1151	^		_	OF:	1			Other commen	se Tompore Life of C	
SAMPLER: Sha	Section 1	FOR IN SECTION		0425 290 692	RELINGUE	SHED BY:		RECI	EVED BY:	1		RELINQUISHED B		RECEIVED BY:
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	o; shane.pescud@hanson.com				DATE/TIME	: 19)09/2019			TA >1 E/TIME:	0		DATE/TIME:		DATE/TIME:
	o: nsw.accounts@hanson.com.au					1		19	19119	10:	112			
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COMMENTATION	ECIAL HANDLINGISTORAGE OF	V DISPOSAL.	Maria Cara Maria	and Records	or experience and a second	2000200-05001					-			
ALS USE	MATRIX: SOLID	DETAILS (S) WATER (W)	6	CONTAINER INFORT	MATION	1				Total (unfiltere		must be listed to attractived) or Dissolved (field		Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	Н.	EC	TSS	TDS	Oil & Grease			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Dam 1 (A)	19/09/2019 6:45am	w	1x P, 1x O&G		2	1	1	1	1	1			
2	Dam 7B/C	19/09/2019 7:00am	w	1x P, 1x O&G		2	1	1	1	1	1			
3	Dam 13 (B)	19/09/2019 7:15am	w	1x P, 1x O&G		2	1	1	1	1	1			
4	Point D Creek	19/09/2019 7:30am	w	1x P, 1x O&G		2	1	1	1	1	1			
5	Point C Spillway	19/09/2019 7:50am	W	1x P, 1x O&G	21-22	2	1	1	1	1	1		Sydr Wo	ronmental Division ney ork Order Reference S1930294
					TOTAL	10	5	5		5	5		Telepho	ne: + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; F = Formaldehyde Preserved Plasti



Work Order : ES1930294

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address : ACCOUNTS PAYABLE LOCKED BAG 5018

PARRAMATTA NSW 2124

Telephone : 02 4375 1151

Project : Hanson Calga Surface Water Monitoring

Order number : 4502621948

C-O-C number : ----

Sampler : SHANE PESCUD

Site : ---

Quote number : EN/333

No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 19-Sep-2019 10:45

Date Analysis Commenced : 19-Sep-2019

Issue Date : 24-Sep-2019 10:32



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : Hanson Calga Surface Water Monitoring

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- TDS by method EA-015 may bias high for samples 4 and 5 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

Sub-Matrix: WATER		Clie	ent sample ID	Dam 1 (A)	Dam 7B/C	Dam 13 (B)	Point D Creek	Point C Spillway
(Matrix: WATER)								
	Cli	ent sampli	ng date / time	19-Sep-2019 06:45	19-Sep-2019 07:00	19-Sep-2019 07:15	19-Sep-2019 07:30	19-Sep-2019 07:50
Compound	CAS Number	LOR	Unit	ES1930294-001	ES1930294-002	ES1930294-003	ES1930294-004	ES1930294-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value		0.01	pH Unit	6.92	7.83	6.81	6.04	6.35
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	μS/cm	91	91	98	42	79
EA015: Total Dissolved Solids dried at 1	180 ± 5 °C							
Total Dissolved Solids @180°C		10	mg/L	50	57	74	36	60
EA025: Total Suspended Solids dried at	t 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	66	69	9	55	19
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5





OFFICE:

CHAIN OF CUSTODY

ALS Laboratory: CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250 please tick >

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DNELDOURNE 34 Medial Rand Stringwale MC 3171 Ph/ 65 8549 8609 Et samples mailtourne @allsglobal.com Ph. 95 2592 8000 E. Banpas Manuschille Brown JANUDGEE 27 Sydney Roan Fludgee NSvV 2850 Ph. 92 6372 6795 E. Puddee mail 2 alchional.com

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JSYDNEY 277-289 Woodpark Road Smathlieft NSW 2184 oh 02 3784 3855 E. campiles agricus and smerilen mass. And oh 02 3784 3855 E. campiles agricus and continue U.D. of E. Campiles agricus and continue u.D. of E. Campiles agricus and continue and continue u.D. of E. Campiles agricus and continue u.C. of E. Campiles agricus
JWOLLONGONG 99 Kenny Street Wellengeng NSW 2500 Ph; 02 4226 3125 fr: partkemplaig alsolobal.com FOR LABORATORY USE ON LY (CIRCLE) Custody Seal Intact?

TURNAROUND REQUIREMENTS: Ph. 08 9209 7655 E. samples peril: @alaglobal.com PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A) (Standard TAT may be longer for some tests e.g., Ultra Standard TAT (List due date): Non Standard or urgent TAT (List due date): ORDER NUMBER: 4502621948 ALS QUOTE NO .: pH priority 23/09/2019 SYBQ 222-19 PROJECT MANAGER: Shane Pescud COC SEQUENCE NUMBER (Circle) Free ice //frozen ice tineks ph SAMPLER: Dale Wilcox CONTACT PH: (02) 4375 1151 COC: 1 COC emailed to ALS? Provided on reciept of samples SAMPLER MOBILE: 0425 290 692 OF: Email Reports to: shane.pescud@hanson.com.au & monitoringresuits@cbased.com.au > RELINQUISHED BY: EDD FORMAT (or default): RECEIVED BY: Email Invoive to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au RELINQUISHED BY: Mar. RECEIVED BY: DATE/TIME: 23/09/2019 COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: DATE/TIME DATE/TIME: 23/9/19 DATE/TIME:

	MATRIC: SOLID (CONTAINER INFORMATION		wi	NALYSIS REC ere Metals are	WIRED Includi required, specia	ng SUITES (i y Total (unfil	NB. Suite Code	es must be liste	ed to attract suite pro	ice)
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to	AL			1	re	quired).	, so dissi	Tived (field filtered	Additional Informatio
0	Discharge Dam 1 (A) 23092019	23/09/2019 6:50am		Schow)	TOTAL	1:		,		Grease			Comments on likely contaminant leve dilutions, or samples requiring specifi analysis etc.
		0.30am	W	1x P, 1x O&G	2	1	1	1 TSS	1	8 EO			analysis etc.
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Container Cod A Vial HCI Pres Acetate Prese	as: P = Unpreserved Plasfic; N = Nitric Preserved; VB = VOA Vial Sodium Bisulphate Preserved Bottle; E = EDTA Preserved Bottle; E = EDTA Preserved Bottle;	erved Plastic; ORC = Nitric Pres served; VS = VOA Vial Sulfurio R	served ORC	TOTAL : SH = Sodium Hydroxide/Gd Preserved: S = Sodium Hyd V = Alfreight Unpreserved Vial SG = Sulfuric Preserved Vial SG = Sulfuri	2	1	1	1	+				



Work Order : ES1930691

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address : PO BOX 206

BATHURST NSW, AUSTRALIA 2795

Telephone : 02 4375 1151

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT

1 (A)

Order number : 4502621948

C-O-C number

Sampler : Dale Wilcox

Site · ____

Quote number : EN/333

No. of samples received : 1 No. of samples analysed : 1

Page : 1 of 2

> Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 23-Sep-2019 09:30

Date Analysis Commenced : 23-Sep-2019

Issue Date : 25-Sep-2019 11:32



ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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- General Comments
- Analytical Results

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Signatories

Client

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT 1 (A)

ALS

General Comments

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Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Discharge Dam 1 (A) 23092019	 	
	Cli	ent sampli	ng date / time	23-Sep-2019 06:50	 	
Compound	CAS Number	LOR	Unit	ES1930691-001	 	
				Result	 	
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	6.54	 	
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	85	 	
EA015: Total Dissolved Solids dried at 1	80 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	53	 	
EA025: Total Suspended Solids dried at	104 ± 2°C					
Suspended Solids (SS)		5	mg/L	28	 	
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	



CHAIN OF CUSTODY

ALS Laboratory: please tick → UADE_AIDE_C1 Burrow Richal Finderlan &A 5060 Dr. 50 9359 PSO () analysis § displaid resi-REFISIANI J. Shame Start Starton CD 1058 05: 07 0043 7300 E1 monates bildon CD 1058 UBD AIDE C1 Start Start Start Start Start UBD AIDE C1 Start Start Start Start Start Start Dr. 57 7471 STONE C district of 3167 poblicion JISANNAY 18 Harbore Rhard Mackay OU.) 4797 Ph. of. 4944917 E. macking historic comp. J. 19 BOURNE 2-4 Wester Roam Sommovine M.C. 4777 Ph. CO. 4819 9470 F. samones mell-counting a scrabbs com JSN25GE 27 Systems Hond (Juriges NSW 2855 Fh. 22 8670 6738 E. midles nswift databased com

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DMOLLONGONG 99 Kenny Street Wollangung NSW 2500 Ph; 02 4229 3125 E. portkembla @atsolobal.com

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	fanson Calga Quarry - 151 Peats Ridge F	Rd Calga NSW 2250		AROUND REQUIREMENTS ; d TAT may be longer for some tests e.g., Ultra		ard TAT (List						8-656	F31 30 - 7 534		ONLY (Circle)
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	MBER: 4502621948							cod	C: 1			Rent	om Sample Te	rhpgrättere c	n Receipt: 15
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Email invoiv	ve to: nsw.accounts@hanson.com.au & c	hanae.delany@hanson.	com.au												300919 1:30
COMMENTS	S/SPECIAL HANDLING/STORAGE OR DIS	SPOSAL:													
ALS USE	SAMPLE DEI MATRIX: SOLID (S)			CONTAINER INFORM	MATION		ANALY Where M	rsis REQU etals are re	FRED (ncluding equired, specify	g SUITES (NB Total (unfilten requ	ed bottle req	s must be liste uired) or Disso	d to attract suitelived (field filte	e price) red bottle	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	Æ	2	155	тоз	Oil & Grease				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Discharge Dam 1 (A) 30092019	30/09/2019 7am	w	1x P, 1x O&G		2	1	1	1	1	1				
		The state of the s										Sydney Work (mental I	erence	_
					TOTAL	2	1	1	1	1	1 5 × 6	elephone : +	61-2-8784 8	555	to me the many

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; VS = VOA Vial Sodium Bisutphate Preserved; VS = VOA Vial Sodium Bisutphate Preserved; VS = VOA Vial Sodium Bisutphate Preserved Plastic; F = Formaldehyde Preserved Glass; VS = VIA Vial Sodium Bisutphate Preserved Plastic; F = Formaldehyde Preserved Glass; VS = VIA Vial Sodium Bisutphate Preserved Plastic; F = Formaldehyde Preserved Glass; VS = VIA Vial Sodium Bisutphate Preserved Plastic; VS = VIA Vial Sodium Bisutph



Work Order : ES1931791

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : MR SHANE PESCUD

Address : PO BOX 206

BATHURST NSW, AUSTRALIA 2795

Telephone : 02 4375 1151

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT

1 (A)

Order number : 4502621948

C-O-C number : ----

Sampler : DALE WILCOX

Site : ---

Quote number : EN/333

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 2

Laboratory : Environmental Division Sydney

Contact : Customer Services ES

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555

Date Samples Received : 30-Sep-2019 13:30

Date Analysis Commenced : 30-Sep-2019

Issue Date : 02-Oct-2019 13:08



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

Client

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories Position Accreditation Category

Ankit Joshi Inorganic Chemist Sydney Inorganics, Smithfield, NSW

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT 1 (A)



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Sub-Matrix: WATER (Matrix: WATER)	WATER)				 	
	CI	ient sampli	ng date / time	30-Sep-2019 07:00	 	
Compound	CAS Number	LOR	Unit	ES1931791-001	 	
				Result	 	
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	6.42	 	
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	84	 	
EA015: Total Dissolved Solids dried at 18	0 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	44	 	
EA025: Total Suspended Solids dried at 1	04 ± 2°C					
Suspended Solids (SS)		5	mg/L	18	 	
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	